### U.S. DEPARTMENT OF HOMELAND SECURITY Federal Emergency Management Agency National Flood Insurance Program

OMB No. 1660-0008 Expiration Date: November 30, 2018

## **ELEVATION CERTIFICATE**

Important: Follow the instructions on pages 1-9.

Copy all pages of this Elevation Certificate and all attachments for (1) community official, (2) insurance agent/company, and (3) building owner.

|   | SEC           | TION A - PROPERTY                               | / INFOR    | MATION   |                          | FOR INSUF                          | RANCE COMPANY USE                  |
|---|---------------|---|------------|--|--------------------------|------------------------------------|------------------------------------|
| A1. Building Owne   | er's Name     |   |            |  |                          | Policy Num                         | ber:                               |
| A2. Building Stree  | t Address (in | cluding Apt., Unit, Suit                        | te, and/o  | r Bldg. No.) o   | r P.O. Route and         | Company N                          | IAIC Number:                       |
| 15702 Spunky Car  | nyon Rd       |   |            |  |                          |                                    |                                    |
| City  |               |   |            | State  |                          | ZIP Code                           |                                    |
| Green Valley  | <del></del>   |   |            | Californi  |                          | 91390                              |                                    |
|   |               | and Block Numbers, Ta<br>& 30 of Tract 6639, MI |            | For A Company of Association Company (Association Company) |                          | c.)<br>                            |                                    |
| A4. Building Use (  | e.g., Resider | ntial, Non-Residential,                         | Addition   | , Accessory,   | etc.) Residential        |                                    | -                                  |
| A5. Latitude/Longi  | tude: Lat. 3  | 34.61657  | Long       | 118.40723  | Horizonta                | l Datum: 🔲 NAD 1                   | 1927 X NAD 1983                    |
| A6. Attach at least   | 2 photograp   | hs of the building if the                       | e Certific | ate is being ι   | used to obtain floo      | d insurance.                       |                                    |
| A7. Building Diagra   | am Number     | 8   |            |  |                          |                                    |                                    |
| A8. For a building  | with a crawls | space or enclosure(s):                          |            |  |                          |                                    |                                    |
| a) Square foo   | tage of craw  | lspace or enclosure(s)                          | ĺ          |  | 1189 sq ft               |                                    |                                    |
| b) Number of p  | permanent flo | ood openings in the cr                          | awlspac    | e or enclosure   | <br>∍(s) within 1.0 foot | above adjacent gra                 | ade 11                             |
| c) Total net ar   | ea of flood o | penings in A8.b                                 |            | 1238 sq in   | 1                        |                                    | ) <del></del> .                    |
| d) Engineered   |               | 60  |            |  |                          |                                    |                                    |
| A9. For a building v  | 10. 10        |   |            |  |                          |                                    |                                    |
| a) Square foot  | age of attach | ned garage                                      |            | N/A sqft   |                          |                                    |                                    |
|   |               | ood openings in the at                          |            |  |                          | acent grade N/A                    |                                    |
|   |               | penings in A9.b                                 | J          | N/A sq   | S <del>=</del> .0        | <u></u>                            | <del></del>                        |
| d) Engineered   |               |   | la         |  |                          |                                    |                                    |
| d) Engineered   | nood openin   | ıgs? ☐ Yes 区 N                                  | 10         |  |                          |                                    |                                    |
|   | SE            | CTION B - FLOOD I                               | NSURA      | NCE RATE   | MAP (FIRM) INF           | ORMATION                           |                                    |
| B1. NFIP Communi  | ity Name & C  | Community Number                                |            | B2. County   | Name                     |                                    | B3. State                          |
| Los Angeles Count   | ty 065043     |   |            | Los Angeles  | s                        |                                    | California                         |
| B4. Map/Panel<br>Number   | B5. Suffix    | B6. FIRM Index<br>Date                          | Effe       | RM Panel<br>ective/<br>vised Date                          | B8. Flood<br>Zone(s)     | B9. Base Flood El<br>(Zone AO, use | levation(s)<br>e Base Flood Depth) |
| 06037C0610  | F             | 09/26/2008                                      | 09/26/2    | 2008   | A and X                  | 2932.7                             |                                    |
| B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9:  ☐ FIS Profile ☐ FIRM ☐ Community Determined ☒ Other/Source: Hydraulic Study by Antelope Valley Engineering, Inc. Oct. 2016 |               |   |            |  |                          |                                    |                                    |
| B11. Indicate elevation datum used for BFE in Item B9: NGVD 1929 NAVD 1988 Other/Source:  |               |   |            |  |                          |                                    |                                    |
| B12. Is the building  | located in a  | Coastal Barrier Reso                            | urces Sy   | stem (CBRS)  | ) area or Otherwis       | e Protected Area (C                | PA)? ☐ Yes ☒ No                    |
| Designation D   | Date: N/A     | □   | CBRS       | □ОРА   |                          |                                    |                                    |
|   |               |   |            |  | ****                     | -                                  |                                    |

### **ELEVATION CERTIFICATE**

OMB No. 1660-0008 Expiration Date: November 30, 2018

| IMPORTANT: In these spaces, copy the corresponding   | information from Sec  | tion A.                   | FOR INSURANCE COMPANY USE  |  |  |  |
|--|---|---------------------------|--|--|--|--|
| Building Street Address (including Apt., Unit, Suite, and/or 15702 Spunky Canyon Rd  | Policy Number:  |                           |  |  |  |  |
| City Green Valley Star   | te CA ZIP   | Code <sub>91390</sub>     | Company NAIC Number  |  |  |  |
| SECTION C – BUILDING EL  | EVATION INFORMAT  | TON (SURVEY RE            | EQUIRED)   |  |  |  |
| C1. Building elevations are based on: Construction   | n Drawings* 🔲 Buil  | ding Under Constru        | uction* X Finished Construction  |  |  |  |
| *A new Elevation Certificate will be required when co  |   |                           |  |  |  |  |
| C2. Elevations – Zones A1–A30, AE, AH, A (with BFE), Complete Items C2.a–h below according to the build  | ling diagram specified i  | n Item A7. In Puerto      | AE, AR/A1–A30, AR/AH, AR/AO.<br>o Rico only, enter meters.   |  |  |  |
| Benchmark Utilized: <u>UL 4301 Palmdale Quad 2010</u>  |   |                           |  |  |  |  |
| Indicate elevation datum used for the elevations in it   | ,   | V.                        |  |  |  |  |
| ☐ NGVD 1929 ☒ NAVD 1988 ☐ Other/S  Datum used for building elevations must be the sam  |   | CC                        |  |  |  |  |
| Batam asca for banding elevations must be the sam  | e as that used for the b  |                           | Check the measurement used.  |  |  |  |
| <ul> <li>a) Top of bottom floor (including basement, crawlsp</li> </ul>  | ace, or enclosure floor)  | 29                        | 933.9 X feet  meters   |  |  |  |
| b) Top of the next higher floor  |   | 29                        | 935.9 X feet  meters   |  |  |  |
| c) Bottom of the lowest horizontal structural membe  | r (V Zones only)  | 1                         | N/A  |  |  |  |
| d) Attached garage (top of slab)   |   | C                         | N/A X feet  meters   |  |  |  |
| e) Lowest elevation of machinery or equipment serv<br>(Describe type of equipment and location in Com  | ricing the building ments)  | 29                        | 937.5 🛛 feet 🗌 meters  |  |  |  |
| f) Lowest adjacent (finished) grade next to building   | (LAG)   | 29                        | 933.8 X feet  meters   |  |  |  |
| g) Highest adjacent (finished) grade next to building  | (HAG)   | 29                        | 934.7 X feet  meters   |  |  |  |
| h) Lowest adjacent grade at lowest elevation of dec<br>structural support  | k or stairs, including  |                           | 934.6 × feet   |  |  |  |
| SECTION D – SURVEYOR,  | ENGINEER, OR ARC  | HITECT CERTIFIC           | CATION   |  |  |  |
| This certification is to be signed and sealed by a land sur<br>I certify that the information on this Certificate represents<br>statement may be punishable by fine or imprisonment un | veyor, engineer, or arch my best efforts to inten   | nitect authorized by      | law to certify elevation information   |  |  |  |
| Were latitude and longitude in Section A provided by a lic   |   |                           | ☒ Check here if attachments.   |  |  |  |
| Certifier's Name   | License Number  |                           |  |  |  |  |
| Justin A. Munz   | C77596  | <del></del>               | ROFESSIONAL ENGINEER   |  |  |  |
| Title<br>Civil Engineer  |   |                           | 10/10/10/1   |  |  |  |
| Company Name<br>Antelope Valley Engineering, Inc.  |   |                           | HOSO SECONDARY AND SECONDARY SECONDA |  |  |  |
| Address<br>129 W. Pondera St.  |   |                           | HO OF THE PERSON NAMED IN COLUMN TO  |  |  |  |
| City<br>Lancaster  | State<br>California   | ZIP Code<br>93534         | Ext.   |  |  |  |
| Signature C. M.  | Date 5-18-17  | Telephone<br>661-948-0805 | Ext.   |  |  |  |
| Copy all pages of this Elevation Certificate and all attachmen   | Copy all pages of this Elevation Certificate and all attachments for (1) community official, (2) insurance agent/company, and (3) building owner. |                           |  |  |  |  |
| Comments (including type of equipment and location, per  | C2(e), if applicable)   | 1                         |  |  |  |  |
| Type of equipment is water heater located on wall on outs  | side of house.  |                           |  |  |  |  |
|  |   |                           |  |  |  |  |
|  |   |                           |  |  |  |  |

### **ELEVATION CERTIFICATE**

OMB No. 1660-0008 Expiration Date: November 30, 2018

| IMPORTANT: In these spaces, copy the corresponding information from Section A.  FOR INSURANCE COMPANY USE  |   |   |  |  |
|--|---|---|--|--|
| Building Street Address (including Apt., Unit, Suite, and/or E<br>15702 Spunky Canyon Rd   | Bldg. No.) or P.O. Rou                            | ite and Box No.                               | Policy Number:   |  |
| City Green Valley State  | CA ZIP  | Code 91390                                    | Company NAIC Number  |  |
| SECTION E – BUILDING ELEVA<br>FOR ZONE AC  | TION INFORMATION AND ZONE A (WIT                  | N (SURVEY NOT<br>THOUT BFE)                   | REQUIRED)  |  |
| For Zones AO and A (without BFE), complete Items E1–E5. complete Sections A, B,and C. For Items E1–E4, use natura enter meters.  | If the Certificate is in all grade, if available. | tended to support a<br>Check the measure      | LOMA or LOMR-F request,<br>ment used. In Puerto Rico only,   |  |
| <ul> <li>E1. Provide elevation information for the following and chec<br/>the highest adjacent grade (HAG) and the lowest adjacent</li> <li>a) Top of bottom floor (including basement,</li> </ul> | ck the appropriate box<br>ent grade (LAG).        | ces to show whether                           | the elevation is above or below  |  |
| crawlspace, or enclosure) is  b) Top of bottom floor (including basement,  | N/A   | ☐ feet ☐ meter                                | s above or below the HAG.  |  |
| crawlspace, or enclosure) is   | N/A   | feet meter                                    |  |  |
| E2. For Building Diagrams 6–9 with permanent flood opening the next higher floor (elevation C2.b in the diagrams) of the building is   | ngs provided in Section N/A                       | on A Items 8 and/or                           |  |  |
| E3. Attached garage (top of slab) is   | N/A   | feet meter                                    | To The Control of the |  |
| E4. Top of platform of machinery and/or equipment servicing the building is  | N/A   | feet meters                                   | s ☐ above or ☐ below the HAG.  |  |
| E5. Zone AO only: If no flood depth number is available, is floodplain management ordinance? Yes N/A   | the top of the bottom                             | floor elevated in acc                         | THE PERSON NAMED AND ADDRESS OF THE PERSON NAMED ADDRESS OF THE PERSON NAMED AND ADDRESS OF TH |  |
| SECTION F – PROPERTY OWNER   | (OR OWNER'S REPR                                  | RESENTATIVE) CE                               | RTIFICATION  |  |
| The property owner or owner's authorized representative who community-issued BFE) or Zone AO must sign here. The sta   | no completes Sections<br>atements in Sections     | s A, B, and E for Zor<br>A, B, and E are corr | ne A (without a FEMA-issued or ect to the best of my knowledge.  |  |
| Property Owner or Owner's Authorized Representative's Natural Justin A. Munz, CE 75596 - Antelope Valley Engineering, In   |   |   |  |  |
| Address  | City  | Sta   | te ZIP Code  |  |
| 129 W. Pondera St.   | Lancaster   | · Ca  | lifornia 93534   |  |
| Signature ( , u )  | Date<br>5-18-17                                   |   | ephone<br>1-948-0805   |  |
| Comments   |   |   |  |  |
| Type of equipment is water heater located on wall on outsid  | e of house.                                       | AR (  | C75596 6/30/18 COVIL PRINTE  |  |
|  |   |   | Chack hard if attachments  |  |

### **ELEVATION CERTIFICATE**

OMB No. 1660-0008 Expiration Date: November 30, 2018

| IMPORTANT: In these spaces, copy the co  |  |                         | FOR INSURANCE COMPANY USE  |  |  |  |
|--|--|-------------------------|--|--|--|--|
| Building Street Address (including Apt., Unit, 15702 Spunky Canyon Rd  | Suite, and/or Bldg. No.) or P.O. Route and Bo.   | x No.                   | Policy Number:   |  |  |  |
| City Green Valley  | State CA ZIP Code 913  | 390                     | Company NAIC Number  |  |  |  |
| SECT   | ION G - COMMUNITY INFORMATION (OPT   | IONAL)                  |  |  |  |  |
| Sections A, B, C (or E), and G of this Elevatic used in Items G8–G10. In Puerto Rico only, e                   | The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8–G10. In Puerto Rico only, enter meters. |                         |  |  |  |  |
| G1. The information in Section C was ta engineer, or architect who is author data in the Comments area below.) | aken from other documentation that has been sized by law to certify elevation information. (In   | signed an<br>dicate the | nd sealed by a licensed surveyor, e source and date of the elevation |  |  |  |
| or Zone AO.  | ction E for a building located in Zone A (withou   |                         |  |  |  |  |
| G3. The following information (Items G4  | I–G10) is provided for community floodplain m  | anageme                 | ent purposes.  |  |  |  |
| G4. Permit Number  | G5. Date Permit Issued   |                         | ate Certificate of ompliance/Occupancy Issued                        |  |  |  |
| G7. This permit has been issued for:   | ☐ New Construction ☐ Substantial Improver  | ment                    |  |  |  |  |
| G8. Elevation of as-built lowest floor (including of the building:   | ng basement)   | feet                    | meters Datum   |  |  |  |
| G9. BFE or (in Zone AO) depth of flooding at   | t the building site:   | feet                    | meters Datum   |  |  |  |
| G10. Community's design flood elevation:   |  | feet                    | meters Datum   |  |  |  |
| Local Official's Name  | Title  |                         |  |  |  |  |
| Community Name   | Telephone  |                         |  |  |  |  |
| Signature  | Date   |                         |  |  |  |  |
| Comments (including type of equipment and lo   | ocation, per C2(e), if applicable)   |                         |  |  |  |  |
|  |  |                         |  |  |  |  |
|  |  |                         |  |  |  |  |
|  |  |                         |  |  |  |  |
|  |  |                         |  |  |  |  |
|  |  |                         |  |  |  |  |
|  |  |                         |  |  |  |  |
|  |  |                         |  |  |  |  |
|  |  |                         | Check here if attachments.   |  |  |  |

### **BUILDING PHOTOGRAPHS**

**ELEVATION CERTIFICATE** 

See Instructions for Item A6.

OMB No. 1660-0008 Expiration Date: November 30, 2018

| IMPORTANT: In these spaces, co                            | FOR INSURANCE COMPANY USE |                   |                     |
|---|---------------------------|-------------------|---------------------|
| Building Street Address (including 15702 Spunky Canyon Rd | Policy Number:            |                   |                     |
| City<br>Green Valley                                      | State<br>California       | ZIP Code<br>91390 | Company NAIC Number |

If using the Elevation Certificate to obtain NFIP flood insurance, affix at least 2 building photographs below according to the instructions for Item A6. Identify all photographs with date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8. If submitting more photographs than will fit on this page, use the Continuation Page.



Photo One

Photo One Caption Front View Taken 5-18-17

Clear Photo One



Photo Two Caption Side view with deck taken 5-18-17

Clear Photo Two

### **BUILDING PHOTOGRAPHS**

Continuation Page

OMB No. 1660-0008 Expiration Date: November 30, 2018

**ELEVATION CERTIFICATE** 

| IMPORTANT: In these spaces, co                            | FOR INSURANCE COMPANY USE |          |                     |
|---|---------------------------|----------|---------------------|
| Building Street Address (including 15702 Spunky Canyon Rd | Policy Number:            |          |                     |
| City  | State                     | ZIP Code | Company NAIC Number |
| Green Valley  | California                | 91390    |                     |

If submitting more photographs than will fit on the preceding page, affix the additional photographs below. Identify all photographs with: date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8.



Photo Three

Photo Three Caption Rear view with 2nd deck taken 5-18-17

Clear Photo Three



Photo Four

Photo Four Caption Typical Flood vent taken 5-18-17

Clear Photo Four

# HYDROLOGY & HYDRAULICS STUDY

15702 Spunky Canyon Rd. Green Valley, CA APN 3228-005-044

October 2016

ANTELOPE VALLEY ENGINEERING, INC. 129 West Pondera Street Lancaster, CA 93534 (661) 948-0805

> Prepared For: Kris Kim 3030 Tournament Dr. Palmdale, CA 93551 Phone: (661) 510-3535



### Introduction

This drainage study is for an existing residence located at 15702 Spunky Canyon Rd. (APN 3228-005-044) in the Green Valley area of the County of Los Angeles. This site is located adjacent to Dowd Canyon with a drainage area from approximately a 4 sq. mile watershed impacting it. The storm water runoff flows from east to west within a natural channel. A previous hydrology study performed by Los Angeles County for the FEMA Flood Insurance Study (FIS) determined the estimated storm water runoff flowing through the site to be approximately 2,982 CFS for a 100 year storm event, which does not include burn & bulking. Per the County of Los Angeles it has been determined that this study will use the Q100 flow to follow FEMA guidelines and that the burn & bulking flows will not be required for this particular study. This study will determine the water surface elevation and flow velocities at the existing structure and determine flood limits using the computer HEC-RAS flow calculations.

### Summary of Runoff and Water Surface Calculations

This site is located adjacent to Dowd Canyon with an upstream drainage area from approximately a 4 sq. mile watershed impacting it. The storm water runoff flows from east to west just south of the existing residence. The natural drainage channel also has overflow areas which are located to the south of this property and to the south of the main flow channel. The Los Angeles County hydrology study which was performed for the FEMA Flood Insurance Study (FIS) shows a Q100 of 2,982 CFS (see sheets A1-A2) for this location. This flow value is used to input into the HEC RAS program (version 5) along with the elevation data from the various surveyed cross sections taken across the existing creek channel areas as shown on map H1. A Manning's n value of 0.040 has been used based on a natural stream channel, winding with lower stages and ineffective slopes and sections, generally an overland flow condition with some straight creek portions.

It should be noted that the elevations shown on the map H1 are based on a temporary datum of elevation 100.00 being the elevation of the county road monument located at the intersection of Calle Corona and Spunky Canyon Road. This is the datum used for the construction plans. In order to convert this datum to NAVD88 the elevations should be adjusted by adding 2837' to the elevations shown on the plan (i.e. elevation of 100.00 on the plan will be 100.00 + 2837 = 2937.00 in NAVD88) which will also be referenced on the project flood elevation certificate.

The HEC RAS program identifies the water surface elevations for the various cross sections which are shown on map sheets H2 thru H4. See appendix for HEC RAS calculations. One cross section has been placed through the existing house structure to show that the water surface is lower than the finish floor. Another cross section has been placed at the upstream side of the proposed garage structure to ensure that this structure is elevated above the Q100 water surface level. Additionally, the other cross sections show the flows at the upstream and downstream ends of the property as well as at the channel change in direction which occurs at this property to ensure that the hydraulic water surface calculations take into account the changes in channel direction.

Another concern that has come up is that the owner has placed a small amount of fill at the area just south and west of the proposed garage during construction. This area just outside the creek northerly bank has been raised approximately 6"-12" in height and has pushed a small amount of fill along the edge of the creek bank as shown on the cross section on sheet H4. The HEC RAS calculations have been performed a second time with this fill section as an existing feature in the cross sections at stations 214.97 and also stations 261.87 to show how it affects the flow depths and limits from the previously existing ground level (prior to fill). The other existing ground sections did not change in this second model run. The results of the HEC RAS calculations show that the water surface at station 261.87 raises from 99.22 to 99.28 with the new fill and at station 214.97 the water surface raises from 97.84 to 97.94. The water surface elevations downstream and upstream of these two sections remain the same, therefore this has a neglible effect on neighboring properties. In addition, the width of the flood path changes a maximum of 2' wider than the previous flood limit calculations which over the length of the approximately 300' wide flow limits is negligible.

### Flood Plain Mapping

Using the HEC RAS program, the flood plain limits for this area can be mapped. See the attached map H1 that shows the limits of the flood plain for the 100 year flows. It should be noted that the existing northerly bank of the creek keeps the flows from encroaching farther to the north (away from the existing residence and proposed garage) and there is an overflow region directly to the south of the creek main channel. Therefore, the existing residence and proposed garage are located outside of the Q100 year flood plain. The current FEMA FIRM map flood zone 'A' goes through the existing house, however, from the detailed site property survey this would not be the case since the house sits on a bank that is higher than the creek water surface elevations. The existing house has a finish floor elevation of 98.93 which is higher than the base flood elevation at the upstream side of the house of 95.67 (interpolated between sections). An elevation certificate is also provided showing the existing house finish floor elevations along with the base flood elevations (BFE) calculated per this study (using the Q100 FEMA FIS flow).

### **Flood Protection**

With the potential for flooding near the existing and proposed structures there has been added flood protection proposed for the structures. This consists of a new barrier wall placed outside of the existing creek limits but upstream of the buildings to provide protection. These walls will have cutoff depths to prevent undermining of the structure. The cutoff depths are determined below using the velocities determined in the above HEC RAS calculations (vel = 8.2 fps) and the Los Angeles County Sedimentation Manual for soft-bottom channels with levees.

```
Scour protection: Ztot = Zdeg + Zgs + Zls + Zbs + Zi + 1/2h

Where: Ztot = total potential vertical adjustment

Zdeg = 0 (channel in equilibrium)

Zgs = 1.55' (see Appendix C-3)

Zls = 2'

Zbs = 1'

Zi = 0

h = 0
```

Ztot = 4.55', therefore use 5' depth for cutoff walls

The rock rip rap size is based on the LA County sizing criteria shown in Appendix B1.

### **Flood Vents**

Per the flood requirements of flood zone 'A' there must be flood vents installed within 12" of grade around the perimeter of the house. The locations are shown on the house plans. The total area required is 1" to 1 square foot of building which is 1189 sf, therefore 1189 sq in are required. The total flood vent area is 1238 sq in which is greater than 1189 sq in, therefore there is adequate flood vents for the structure.



# LOS ANGELES COUNTY, CALIFORNIA

AND INCORPORATED AREAS

### **VOLUME 2 OF 4**

| Community Name                              | Community<br>Number | Community Name                | Community<br>Number | Community Number                | Communit<br>Name | <sup>y</sup> Community Number | Community<br>Number |
|---|---------------------|-------------------------------|---------------------|---------------------------------|------------------|-------------------------------|---------------------|
| LOS ANGELES COUNTY,<br>UNINCORPORATED AREAS | 065043              | DIAMOND BAR, CITY OF          | 060741              | LAWNDALE, CITY OF*              | 060134           | SAN DIMAS, CITY OF            | 060154              |
| AGOURA HILLS, CITY OF                       | 065072              | DOWNEY, CITY OF               | 060645              | LOMITA, CITY OF*                | 060135           | SAN FERNANDO, CITY OF*        | 060628              |
| ALHAMBRA, CITY OF*                          | 060095              | DUARTE, CITY OF               | 065026              | LONG BEACH, CITY OF             | 060136           | SAN GABRIEL, CITY OF*         | 065055              |
| ARCADIA, CITY OF                            | 065014              | EL MONTE, CITY OF*            | 060658              | LOS ANGELES, CITY OF            | 060137           | SAN MARINO, CITY OF*          | 065057              |
| ARTESIA, CITY OF*                           | 060097              | EL SEGUNDO, CITY OF           | 060118              | LYNWOOD, CITY OF                | 060635           | SANTA CLARITA, CITY OF        | 060729              |
| AVALON, CITY OF                             | 060098              | GARDENA, CITY OF              | 060119              | MALIBU, CITY OF                 | 060745           | SANTA FE SPRINGS, CITY OF     | 060158              |
| AZUSA, CITY OF                              | 065015              | GLENDALE, CITY OF             | 065030              | MANHATTAN BEACH, CITY OF        | 060138           | SANTA MONICA, CITY OF         | 060159              |
| BALDWIN PARK, CITY OF*                      | 060100              | GLENDORA, CITY OF             | 065031              | MAYWOOD, CITY OF*               | 060651           | SIERRA MADRE, CITY OF         | 065059              |
| BELL GARDENS, CITY OF                       | 060656              | HAWAIIAN GARDENS, CITY OF*    | 065032              | MONROVIA, CITY OF               | 065046           | SIGNAL HILL, CITY OF*         | 060161              |
| BELL, CITY OF*                              | 060101              | HAWTHORNE, CITY OF*           | 060123              | MONTEBELLO, CITY OF             | 060141           | SOUTH EL MONTE, CITY OF*      | 060162              |
| BELLFLOWER, CITY OF                         | 060102              | HERMOSA BEACH, CITY OF        | 060124              | MONTEREY PARK, CITY OF*         | 065047           | SOUTH GATE, CITY OF           | 060163              |
| BEVERLY HILLS, CITY OF*                     | 060655              | HIDDEN HILLS, CITY OF         | 060125              | NORWALK, CITY OF                | 060652           | SOUTH PASADENA, CITY OF*      | 065061              |
| BRADBURY, CITY OF                           | 065017              | HUNTINGTON PARK, CITY OF*     | 060126              | PALMDALE, CITY OF               | 060144           | TEMPLE CITY, CITY OF          | 060653              |
| BURBANK, CITY OF                            | 065018              | INDUSTRY, CITY OF             | 065035              | PALOS VERDES ESTATES, CITY OF   | 060145           | TORRANCE, CITY OF             | 060165              |
| CALABASAS, CITY OF                          | 060749              | INGLEWOOD, CITY OF*           | 065036              | PARAMOUNT, CITY OF              | 065049           | VERNON, CITY OF*              | 060166              |
| CARSON, CITY OF                             | 060107              | IRWINDALE, CITY OF*           | 060129              | PASADENA, CITY OF               | 065050           | WALNUT, CITY OF               | 065069              |
| CERRITOS, CITY OF                           | 060108              | LA CANADA FLINTRIDGE, CITY OF | 060669              | PICO RIVERA, CITY OF            | 060148           | WEST COVINA, CITY OF          | 060666              |
| CLAREMONT, CITY OF                          | 060109              | LA HABRA HEIGHTS, CITY OF     | 060701              | POMONA, CITY OF                 | 060149           | WEST HOLLYWOOD, CITY OF       | 060720              |
| COMMERCE, CITY OF                           | 060110              | LA MIRADA, CITY OF            | 060131              | RANCHO PALOS VERDES, CITY OF    | 060464           | WESTLAKE VILLAGE, CITY OF     | 060744              |
| COMPTON, CITY OF                            | 060111              | LA PUENTE, CITY OF*           | 065039              | REDONDO BEACH, CITY OF          | 060150           | WHITTIER, CITY OF             | 060169              |
| COVINA, CITY OF                             | 065024              | LA VERNE, CITY OF             | 060133              | ROLLING HILLS ESTATES, CITY OF* | 065054           |                               |                     |
| CUDAHY, CITY OF                             | 060657              | LAKEWOOD, CITY OF             | 060130              | ROLLING HILLS, CITY OF          | 060151           |                               |                     |
| CULVER CITY, CITY OF                        | 060114              | LANCASTER, CITY OF            | 060672              | ROSEMEAD, CITY OF               | 060153           |                               |                     |

\*Non-floodprone communities

September 26, 2008



# **Federal Emergency Management Agency**

FLOOD INSURANCE STUDY NUMBER 06037CV002A

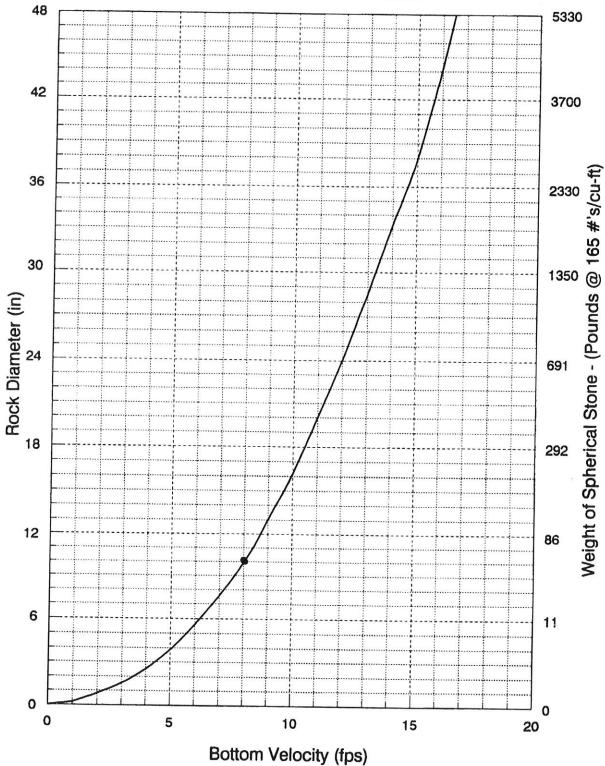
# Table 7 - SUMMARY OF PEAK DISCHARGES

Peak Discharges (cfs)

|          | 0.2-Percent-Annual-Chance              | 8,292   | 22,326  | 17.818  | 3,221   | 7,176  | 6,166   | 5,963                                   | 4,281                                     |
|----------|--|---|---|---|---|--|---|---|---|
|          | 100 Yr Flow<br>I-Percent-Annual-Chance | 4,523   | 11,805  | 9,421   | 1,713   | 3,455  | 2,969   | (2,982)                                 | 2,140                                     |
|          | 2-Percent-Annual-Chance                | I   | •   |   | l   | I  | 1   | 1                                       | 1   |
|          | 10-Percent-Annual-Chance               | I   | ľ   | ;   | I   | 1  | 1   | 1                                       | 1   |
| Drainage | Area (sq. mi.)                         | 5.9   | 16.8  | 10.5  | 3.8   | 7.7  | 6.4   | 3.9                                     | 2.7                                       |
|          | Flooding Source and Location           | Halsey Canyon Approximately<br>550 feet Downstream of<br>Romero Canyon Road | Castaic Creek Approximately 2,100 feet Upstream of Confluence with Charlie Canyon | Violin Canyon Approximately 2,000 feet Downstream of Interstate Highway 5 | Gorman Creek Approximately<br>250 feet North of Interstate<br>Highway 5 Overcrossing<br>Gorman Road | Elizabeth Canyon<br>Approximately 2,300 feet<br>Downstream of Elizabeth Lake<br>Pine Canyon Road | Pine Canyon Approximately<br>1,200 feet Upstream of Lake<br>Hughes Road | Dowd Canyon at Calle Corona<br>Extended | San Francisquito Canyon at<br>Spunky Road |

137

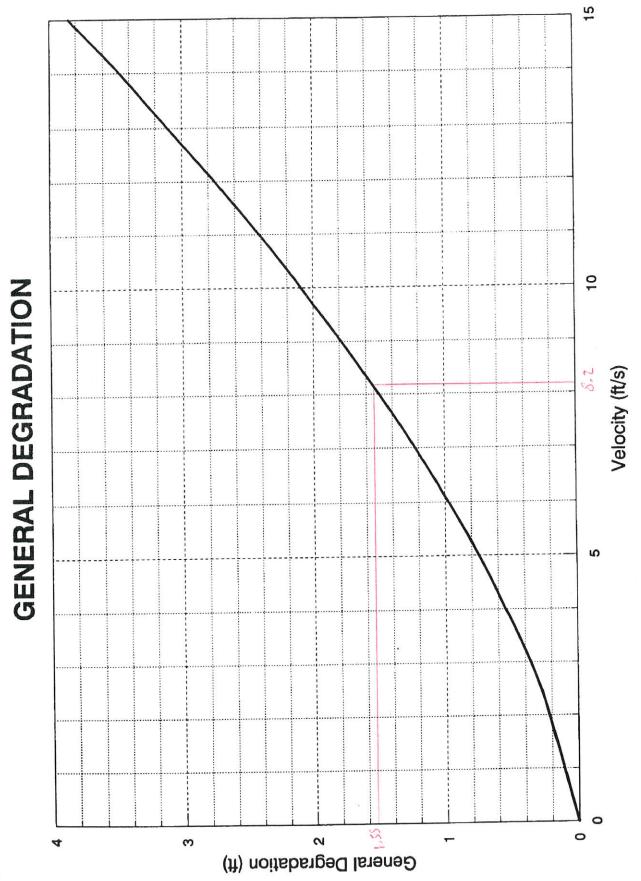
# RIPRAP ROCK SIZE

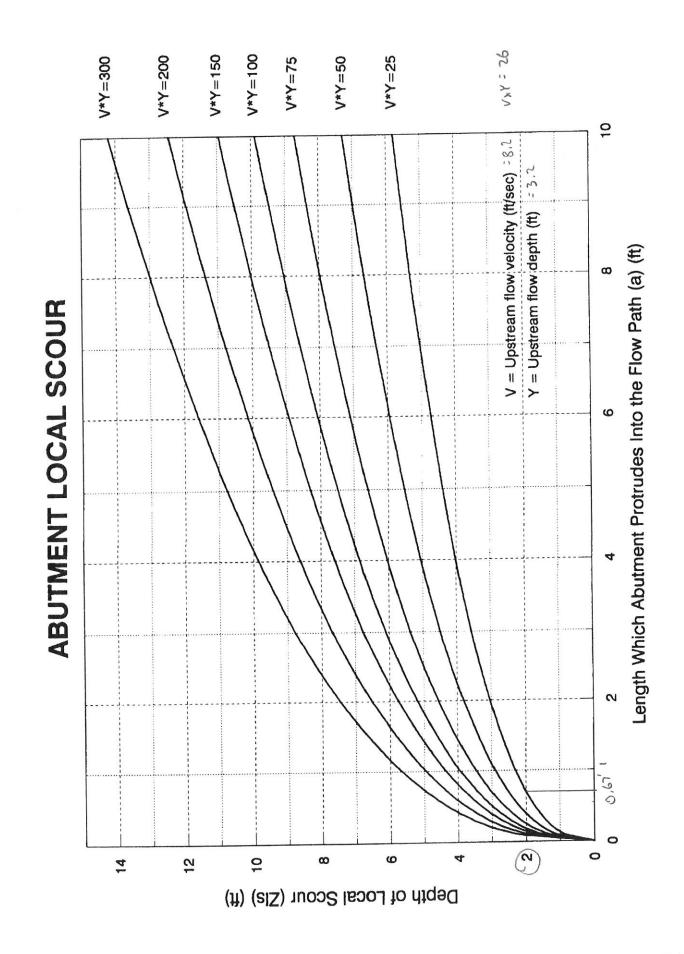


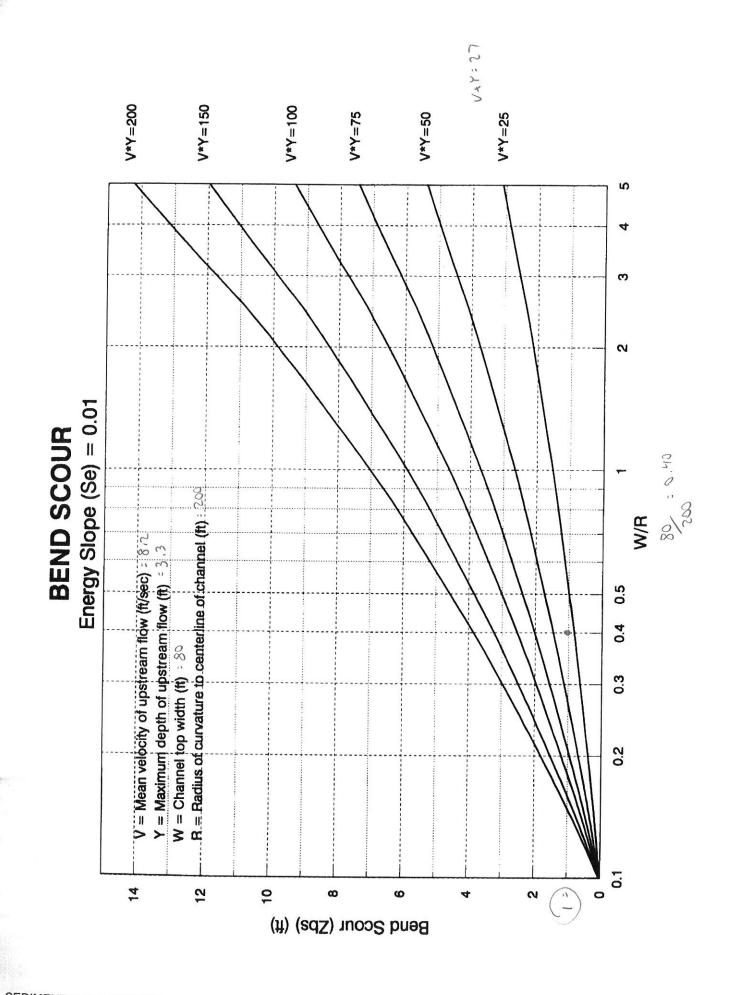
For rock with specific gravity = 2.65

Source: Bureau of Reclamation









# APPENDIX D HEC RAS CALCULATIONS PRIOR TO BANK MODIFICATIONS

HEC-RAS HEC-RAS 5.0.3 September 2016 U.S. Army Corps of Engineers Hydrologic Engineering Center 609 Second Street Davis, California

X XXXXXX XXXX XXXX XX XXXX Χ X X X XXX X X X XX X X  $X \quad X \quad X \quad X$ X XXXXXXX XXXX XXX XXXX X XXXXXX XXXX X XX X X X X XX X XX X X  $X \quad X \quad X \quad X$ Χ X XXXXXX XXXX  $X \quad X \quad X$ X XXXXX

PROJECT DATA

Project Title: 13031 Cyn Creek 1 Project File: 13031CynCreek1.pri

Run Date and Time: 10/21/2016 11:30:33 AM

Project in English units

### PLAN DATA

Plan Title: 13031 Cyn Creek Plan new

Plan File: f:\PROJECTS\13031\hec ras\New\13031CynCreek1.p01

Geometry Title: 13031 Cyn Creek 1 Geo

Geometry File: f:\PROJECTS\13031\hec ras\New\13031CynCreek1.g01

Flow Title : 13031 Cyn Creek Flow Data

Flow File : f:\PROJECTS\13031\hec ras\New\13031CvnCreek1.f01

Plan Summary Information:

Number of:  $\dot{C}$ ross Sections = 5 Multiple Openings = 0

Culverts = 0 Inline Structures = 0Bridges = 0 Lateral Structures =

Computational Information

Water surface calculation tolerance = 0.01

Critical depth calculation tolerance = 0.01

Maximum number of iterations

Maximum difference tolerance = 0.3

Flow tolerance factor = 0.001

Computation Options

Critical depth computed only where necessary

Conveyance Calculation Method: At breaks in n values only

Friction Slope Method:

Average Conveyance

Computational Flow Regime: Subcritical Flow

### FLOW DATA

Flow Title: 13031 Cyn Creek Flow Data

Flow File: f:\PROJECTS\13031\hec ras\New\13031CynCreek1.f01

Flow Data (cfs)

River Reach 100 Yr

353.54 Cyn Creek 1 CL 2982

**Boundary Conditions** 

13031CynCreek1.rep.txt Upstream Downstream

Reach Profile

Cyn Creek 1 CL 100 Yr Normal S = 0.031

### **GEOMETRY DATA**

River

Geometry Title: 13031 Cyn Creek 1 Geo

Geometry File: f:\PROJECTS\13031\hec ras\New\13031CynCreek1.g01

### **CROSS SECTION**

RIVER: Cyn Creek 1

REACH: CL RS: 353.54

INPUT

Description:

Station Elevation Data num= 27

Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev 0 104.6547.32999 10448.10999 103.97 48.44 103.92 145.13 101.43 154.76 101.7 158.31 101.81 173.5 102.04 241.7 101.94 250.33 101.62 257.64 101.75 258.69 101.77 270.3 99.79 270.72 99.71 271.69 99.7 273.16 99.67 292.23 99.35 301.64 99.2 307.87 99.31 317.09 99.51 328.67 99.72 331.52 99.77 331.53 99.95 334.4 100.49 340.56 102.45

343.95 102.64 362.93 103.47

Manning's n Values num= Sta n Val Sta n Val Sta n Val .04 0 .04 362.93 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 0 362.93 91.67 91.67 91.67 .1

### CROSS SECTION OUTPUT Profile #100 Yr

| E.G. Elev (ft)     | 103.73 Element              | Left OB Channel | Right OB |
|--------------------|-----------------------------|-----------------|----------|
| Vel Head (ft)      | 0.80 Wt. n-Val.             | 0.040           | .50      |
| W.S. Elev (ft)     | 102.93 Reach Len. (ft)      | 91.67 91.67     | 91.67    |
| Crit W.S. (ft)     | 102.93 Flow Area (sq ft)    | 416.90          |          |
| E.G. Slope (ft/ft) | 0.020221 Area (sq ft)       | 416.90          |          |
| Q Total (cfs)      | 2982.00 Flow (cfs)          | 2982.00         |          |
| Top Width (ft)     | 263.83 Top Width (ft)       | 263.83          |          |
| Vel Total (ft/s)   | 7.15 Avg. Vel. (ft/s)       | 7.15            |          |
| Max Chl Dpth (ft)  | 3.73 Hydr. Depth (ft)       | 1.58            |          |
| Conv. Total (cfs)  | 20970.3 Conv. (cfs)         | 20970.3         |          |
| Length Wtd. (ft)   | 91.67 Wetted Per. (ft)      | 264.59          |          |
| Min Ch El (ft)     | 99.20 Shear (lb/sq ft)      | 1.99            |          |
| Alpha              | 1.00 Stream Power (lb/ft s) | 14.23           |          |
| Frctn Loss (ft)    | 1.86 Cum Volume (acre-ft)   | 3.01            |          |
| C & E Loss (ft)    | 0.01 Cum SA (acres)         | 1.92            |          |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

### **CROSS SECTION**

RIVER: Cyn Creek 1

REACH: CL RS: 261.87

INPUT Description:

Station Elevation Data num= 33

Sta Elev Sta Elev Sta Elev Elev Sta Elev Sta

```
13031CynCreek1.rep.txt
```

0 104.031.929993 10416.98999 103.1351.35999 100.5982.23999 96.69 83.09 96.7 83.88 96.71 84.12 96.7287.94998 96.81 171.63 99.19 186.94 99.38 197.49 98.9 246.1 98.14 275.77 98.21 279.06 98.39 280.09 98.44 287.64 97.45 290.44 96.88 295.26 96.77 299.82 96.71 312.23 96.21 315.08 96.09 327.88 96.01 355.32 96.37 355.44 96.37 355.52 96.4 365.87 99.66 367.97 99.66 368.47 99.66 385.02 99.68 389.92 99.67 391.81 99.72 420.59 100.61

Manning's n Values num= 3 Sta n Val Sta n Val Sta n Val 0 .04 0 .04 420.59 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 0 420.59 46.9 46.9 46.9 .1 .3

### CROSS SECTION OUTPUT Profile #100 Yr

| E.G. Elev (ft)     | 99.97 Element               | Left OB Channel Right OB |
|--------------------|-----------------------------|--------------------------|
| Vel Head (ft)      | 0.75 Wt. n-Val.             | 0.040                    |
| W.S. Elev (ft)     | 99.22 Reach Len. (ft)       | 46.90 46.90 46.90        |
| Crit W.S. (ft)     | 99.22 Flow Area (sq ft)     | 430.01                   |
| E.G. Slope (ft/ft) | 0.020303 Area (sq ft)       | 430.01                   |
| Q Total (cfs)      | 2982.00 Flow (cfs)          | 2982.00                  |
| Top Width (ft)     | 285.95 Top Width (ft)       | 285.95                   |
| Vel Total (ft/s)   | 6.93 Avg. Vel. (ft/s)       | 6.93                     |
| Max Chl Dpth (ft)  | 3.21 Hydr. Depth (ft)       | 1.50                     |
| Conv. Total (cfs)  | 20928.0 Conv. (cfs)         | 20928.0                  |
| Length Wtd. (ft)   | 46.90 Wetted Per. (ft)      | 286.74                   |
| Min Ch El (ft)     | 96.01 Shear (lb/sq ft)      | 1.90                     |
| Alpha              | 1.00 Stream Power (lb/ft s) | 13.18                    |
| Frctn Loss (ft)    | 0.96 Cum Volume (acre-ft    | 2.11                     |
| C & E Loss (ft)    | 0.00 Cum SA (acres)         | 1.34                     |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

### CROSS SECTION

RIVER: Cyn Creek 1

REACH: CL RS: 214.97

INPUT

Description:

Station Elevation Data num= 34

 Sta
 Elev
 Sta
 Sta
 Ele

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .04 0 .04 452.13 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 0 452.13 95.05 95.05 95.05 .1 .3

### CROSS SECTION OUTPUT Profile #100 Yr

| E.G. Elev (ft) | 98.59 | Element         | Left OB | Channel | Right OB |
|----------------|-------|-----------------|---------|---------|----------|
| Vel Head (ft)  | 0.75  | Wt. n-Val.      | 0       | .040    |          |
| W.S. Elev (ft) | 97.84 | Reach Len. (ft) | 95.05   | 95.05   | 95.05    |

13031CynCreek1.rep.txt Crit W.S. (ft) 97.84 Flow Area (sq ft) 429.12 E.G. Slope (ft/ft) 0.020537 Area (sq ft) 429.12 2982.00 Flow (cfs) Q Total (cfs) 2982.00 Top Width (ft) 286.80 Top Width (ft) 286.80 Vel Total (ft/s) 6.95 Avg. Vel. (ft/s) 6.95 Max Chl Dpth (ft) 3.65 Hydr. Depth (ft) 1.50 Conv. Total (cfs) 20808.5 Conv. (cfs) 20808.5 Length Wtd. (ft) 95.05 Wetted Per. (ft) 287.73 Min Ch El (ft) 94.19 Shear (lb/sq ft) 1.91 Alpha 1.00 Stream Power (lb/ft s) 13.29 Frctn Loss (ft) 1.95 Cum Volume (acre-ft) 1.65 C & E Loss (ft) 0.00 Cum SA (acres) 1.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

### **CROSS SECTION**

RIVER: Cyn Creek 1

REACH: CL RS: 119.92

INPUT

Description:

Station Elevation Data num= 54 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev 0 103.6 28.94 101.24 32.06 100.55 61.97 93.82 70.31 93.9 113.54 94.37 149.5 95.33 168.93 95.46 172.48 95.33 179.75 95.06 194.78 94.71 195.44 94.69 239.16 93.87 240.38 93.83 247.61 92.28 249.64 91.47 258.07 91.12 265.63 92.62 276 93.02 279.56 93.16 294.29 93.09 327.42 92.26 328.3 92.3 329.03 92.05 330.5 92.59 344.07 97.83 344.5 97.83 349.7 97.64 349.71 97.64 349.72 97.64 349.74 97.64 356.54 97.46 356.55 97.46 358.32 97.48 358.33 97.48 360.4 97.51 360.46 97.51 360.47 97.51 363.41 97.39 363.53 97.38 384.62 96.5 385.56 96.46 385.93 96.44 388.36 96.34 388.38 96.34 393.73 96.71 400.98 96.63 401.18 96.65 407.88 97.39 409.42 97.56 409.43 97.56 411.53 97.45 411.58 97.45 412.25 97.43

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .04 0 .04 412.25 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 0 412.25 79.97 79.97 .1 .3

### CROSS SECTION OUTPUT Profile #100 Yr

| E.G. Elev (ft)<br>Vel Head (ft) | 96.19 Element<br>0.78 Wt. n-Val. | Left OB Channel Right OB 0.040 |
|---------------------------------|----------------------------------|--------------------------------|
| W.S. Elev (ft)                  | 95.42 Reach Len. (ft)            | 79.97 79.97 79.97              |
| Crit W.S. (ft)                  | 95.42 Flow Area (sq ft)          | 422.01                         |
| E.G. Slope (ft/ft)              | 0.020579 Area (sq ft)            | 422.01                         |
| Q Total (cfs)                   | 2982.00 Flow (cfs)               | 2982.00                        |
| Top Width (ft)                  | 275.01 Top Width (ft)            | 275.01                         |
| Vel Total (ft/s)                | 7.07 Avg. Vel. (ft/s)            | 7.07                           |
| Max Chl Dpth (ft)               | 4.30 Hydr. Depth (ft)            | 1.53                           |
| Conv. Total (cfs)               | 20787.4 Conv. (cfs)              | 20787.4                        |
| Length Wtd. (ft)                | 79.97 Wetted Per. (ft)           | 276.39                         |
| Min Ch El (ft)                  | 91.12 Shear (lb/sq ft)           | 1.96                           |
| Alpha                           | 1.00 Stream Power (lb/ft s)      | 13.86                          |
| Frctn Loss (ft)                 | 1.58 Cum Volume (acre-ft         | 0.72                           |
| C & E Loss (ft)                 | 0.03 Cum SA (acres)              | 0.42                           |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

### 13031CynCreek1.rep.txt

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

### **CROSS SECTION**

RIVER: Cyn Creek 1

REACH: CL

RS: 39.95

**INPUT** 

Description:

 Station Elevation Data
 num=
 31

 Sta
 Elev
 93.45
 105.34
 93.16

 113.91
 93.26
 119.93
 93.43
 123.26
 93.45
 151.16
 92.51
 157.17
 92.3

 182.64
 91.34
 207.7
 90.79
 210.52
 89.25
 215.27
 88.31
 224.7
 88.31

 236.94
 88.32
 240.69
 88.32
 253.65
 88.43
 275.45
 89.99
 302.32
 91.25

 324.7
 91.3
 332.95
 91.3
 339.62
 92.41
 340.12
 92.43
 357.12
 93.04

 378.1
 93.43
 394.47
 97
 404.13
 99.23
 406.37
 99.28
 420.1
 98.38

 441.24
 96.46

Manning's n Values num= 3 Sta n Val Sta n Val Sta n Val 0 .04 0 .04 441.24 .04

Bank Sta: Left Right Coeff Contr. Expan. 0 441.24 .1 .3

### CROSS SECTION OUTPUT Profile #100 Yr

| E.G. Elev (ft)     | 93.34 Element               | Left OB Channel Right OB |
|--------------------|-----------------------------|--------------------------|
| Vel Head (ft)      | 1.03 Wt. n-Val.             | 0.040                    |
| W.S. Elev (ft)     | 92.30 Reach Len. (ft)       |                          |
| Crit W.S. (ft)     | 92.30 Flow Area (sq ft)     | 365.56                   |
| E.G. Slope (ft/ft) | 0.019101 Area (sq ft)       | 365.56                   |
| Q Total (cfs)      | 2982.00 Flow (cfs)          | 2982.00                  |
| Top Width (ft)     | 181.86 Top Width (ft)       | 181.86                   |
| Vel Total (ft/s)   | 8.16 Avg. Vel. (ft/s)       | 8.16                     |
| Max Chl Dpth (ft)  | 3.99 Hydr. Depth (ft)       | 2.01                     |
| Conv. Total (cfs)  | 21576.5 Conv. (cfs)         | 21576.5                  |
| Length Wtd. (ft)   | Wetted Per. (ft)            | 182.53                   |
| Min Ch El (ft)     | 88.31 Shear (lb/sq ft)      | 2.39                     |
| Alpha              | 1.00 Stream Power (lb/ft s) | 19.48                    |
| Frctn Loss (ft)    | Cum Volume (acre-ft)        |                          |
| C & E Loss (ft)    | Cum SA (acres)              |                          |
|                    |                             |                          |

Warning: Slope too steep for slope area to converge during supercritical flow calculations (normal depth is below critical depth). Water surface set to critical depth.

### SUMMARY OF MANNING'S N VALUES

### River:Cyn Creek 1

| Reach | River Sta. | n1  | n2  | n3  |
|-------|------------|-----|-----|-----|
| CL    | 353.54     | .04 | .04 | .04 |
| CL    | 261.87     | .04 | .04 | .04 |
| CL    | 214.97     | .04 | .04 | .04 |
| CL    | 119.92     | .04 | .04 | .04 |
| CL    | 39.95      | .04 | .04 | .04 |

### SUMMARY OF REACH LENGTHS

### River: Cyn Creek 1

| Reach | River Sta. | Left  | Channel | Right |
|-------|------------|-------|---------|-------|
| CL    | 353.54     | 91.67 | 91.67   | 91.67 |
| CL    | 261.87     | 46.9  | 46.9    | 46.9  |
| CL    | 214.97     | 95.05 | 95.05   | 95.05 |
| CL    | 119.92     | 79.97 | 79.97   | 79.97 |
| CL    | 39.95      |       |         |       |

# SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS River: Cyn Creek 1 $\,$

| Reach | River Sta. | Contr. | Expan. |
|-------|------------|--------|--------|
| CL    | 353.54     | .1     | .3     |
| CL    | 261.87     | .1     | .3     |
| CL    | 214.97     | .1     | .3     |
| CL    | 119.92     | .1     | .3     |
| CL    | 39.95      | .1     | .3     |

### Profile Output Table - Standard Table 1

| Reach<br># Chl | River Sta | Profile | Q Total | Min Ch El | W.S. Elev | Crit W.S.  | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude |
|----------------|-----------|---------|---------|-----------|-----------|------------|-----------|------------|----------|-----------|-----------|--------|
| <i>"</i> O.I.I |           | (cfs    | s) (ft) | (ft)      | (ft)      | (ft) (ft/f | t) (ft/s) | (sq ft)    | (ft)     |           |           |        |
| CL             | 353.54    | 100 Yr  | 2982.00 | 99.20     | 102.93    | 102.93     | 103.73    | 0.020221   | 7.15     | 416.90    | 263.83    | 1.00   |
| CL             | 261.87    | 100 Yr  | 2982.00 | 96.01     | 99.22     | 99.22      | 99.97     | 0.020303   | 6.93     | 430.01    | 285.95    | 1.00   |
| CL             | 214.97    | 100 Yr  | 2982.00 | 94.19     | 97.84     | 97.84      | 98.59     | 0.020537   | 6.95     | 429.12    | 286.80    | 1.00   |
| CL             | 119.92    | 100 Yr  | 2982.00 | 91.12     | 95.42     | 95.42      | 96.19     | 0.020579   | 7.07     | 422.01    | 275.01    | 1.01   |
| CL             | 39.95     | 100 Yr  | 2982.00 | 88.31     | 92.30     | 92.30      | 93.34     | 0.019101   | 8.16     | 365.56    | 181.86    | 1.01   |

# APPENDIX E HEC RAS CALCULATIONS AFTER BANK MODIFICATIONS

HEC-RAS HEC-RAS 5.0.3 September 2016 U.S. Army Corps of Engineers Hydrologic Engineering Center 609 Second Street Davis, California

X XXXXXX XXXX XXXX XX XXXX  $X \quad X \quad X \quad X$ X XX X X X XX X X X X XX XXXXXXX XXXX XXX XXXX XXXXXX XXXX XX X XX X X X X XX X X  $X \quad X \quad X \quad X$ X Χ X XXXXXX XXXX $X \quad X \quad X$ X XXXXX

PROJECT DATA

Project Title: Creek Mod 3 Project File: CreekMod3.prj

Run Date and Time: 10/21/2016 11:12:45 AM

Project in English units

### PLAN DATA

Plan Title: Creek Mod 3 Plan

Plan File: f:\PROJECTS\13031\hec ras\New creek owner mod\CreekMod3.p01

Geometry Title: Creek Mod 3 geo data

Geometry File: f:\PROJECTS\13031\hec ras\New creek owner mod\CreekMod3.g01

Flow Title : Creek Mod flow data

: f:\PROJECTS\13031\hec ras\New creek owner mod\CreekMod3.f01 Flow File

Plan Summary Information:

Number of: Cross Sections = 5 Multiple Openings = 0 = 0 Inline Structures = 0 Culverts

= 0 Lateral Structures = 0

Bridges

Computational Information

Water surface calculation tolerance = 0.01

Critical depth calculation tolerance = 0.01

Maximum number of iterations = 20

Maximum difference tolerance = 0.3

Flow tolerance factor = 0.001

Computation Options

Critical depth computed only where necessary

Conveyance Calculation Method: At breaks in n values only

Friction Slope Method:

Average Conveyance

Computational Flow Regime: Subcritical Flow

### FLOW DATA

Flow Title: Creek Mod flow data

Flow File: f:\PROJECTS\13031\hec ras\New creek owner mod\CreekMod3.f01

Flow Data (cfs)

River Reach 100 yr 353.54 Creek mod 3 Creek Cl 2982

**Boundary Conditions** 

CreekMod3.rep.txt

River

Reach

Profile

Upstream

Downstream

Creek mod 3 Creek Cl

100 yr

Normal S = 0.031

### GEOMETRY DATA

Geometry Title: Creek Mod 3 geo data

Geometry File: f:\PROJECTS\13031\hec ras\New creek owner mod\CreekMod3.q01

### CROSS SECTION

RIVER: Creek mod 3

REACH: Creek CI

RS: 353.54

**INPUT** 

Description:

Station Elevation Data num= 29

Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev 10448.10999 103.97 48.44 103.92 145.13 101.43 0 104.6547.32999 154.76 101.7 158.31 101.81 173.5 102.04 241.7 101.94 250.33 101.62 257.64 101.75 258.69 101.77 270.3 99.79 270.72 99.71 271.69 99.7 273.16 99.67 292.23 99.35 301.64 99.2 307.87 99.31 317.09 99.51 326.17 99.67 328.67 99.72 331.52 99.77 331.53 99.95 332.29 100.1 334.31 100.48 340.56 102.45 343.95 102.64 362.93 103.47

Manning's n Values num= 3 Sta n Val Sta n Val Sta n Val .04 0 0 .04 362.93 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 91.67 91.67 91.67 0 362.93 .1 .3

### CROSS SECTION OUTPUT Profile #100 yr

| E.G. Elev (ft)     | 103.73 Element              | Left OB Channel Right OB |
|--------------------|-----------------------------|--------------------------|
| Vel Head (ft)      | 0.80 Wt. n-Val.             | 0.040                    |
| W.S. Elev (ft)     | 102.93 Reach Len. (ft)      | 91.67 91.67 91.67        |
| Crit W.S. (ft)     | 102.93 Flow Area (sq ft)    | 415.83                   |
| E.G. Slope (ft/ft) | 0.020370 Area (sq ft)       | 415.83                   |
| Q Total (cfs)      | 2982.00 Flow (cfs)          | 2982.00                  |
| Top Width (ft)     | 263.59 Top Width (ft)       | 263.59                   |
| Vel Total (ft/s)   | 7.17 Avg. Vel. (ft/s)       | 7.17                     |
| Max Chl Dpth (ft)  | 3.73 Hydr. Depth (ft)       | 1.58                     |
| Conv. Total (cfs)  | 20893.4 Conv. (cfs)         | 20893.4                  |
| Length Wtd. (ft)   | 91.67 Wetted Per. (ft)      | 264.35                   |
| Min Ch El (ft)     | 99.20 Shear (lb/sq ft)      | 2.00                     |
| Alpha              | 1.00 Stream Power (lb/ft s) | 14.35                    |
| Frctn Loss (ft)    | 1.89 Cum Volume (acre-ft)   | 3.01                     |
| C & E Loss (ft)    | 0.01 Cum SA (acres)         | 1.94                     |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

### **CROSS SECTION**

RIVER: Creek mod 3

REACH: Creek Cl RS: 261.87

**INPUT** Description:

Station Elevation Data num= 36

Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

```
CreekMod3.rep.txt
    0 104.031.929993
                      10416.98999 103.1351.35999 100.5982.23999 96.69
        96.7 83.88 96.71 84.12 96.7287.94998 96.81 171.63 99.19
 186.94 99.38 197.49 98.9 246.1 98.14 275.77 98.21 279.06 98.39
 280.09 98.44 287.64 97.45 290.44 96.88 295.26 96.77 299.82 96.71
 312.23 96.21 315.08 96.09 327.88 96.01 339.04 96.16 347.14 96.23
 349.84 97.22 351.24 97.54 355.36 98.19 355.44 98.2 355.52 98.21
 365.87 99.83 368.47 99.83 385.02 99.72 389.92 99.67 391.81 99.72
 420.59 100.61
Manning's n Values
                   num=
  Sta n Val
            Sta n Val Sta n Val
```

.04 .04 0 .04 420.59

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 0 420.59 46.9 46.9 46.9 .1 .3

### CROSS SECTION OUTPUT Profile #100 yr

| E.G. Elev (ft)     | 100.03 Element              | Left OB Channel | Right OB |
|--------------------|-----------------------------|-----------------|----------|
| Vel Head (ft)      | 0.75 Wt. n-Val.             | 0.040           | 5        |
| W.S. Elev (ft)     | 99.28 Reach Len. (ft)       | 46.90 46.90     | 46.90    |
| Crit W.S. (ft)     | 99.28 Flow Area (sq ft)     | 429.19          |          |
| E.G. Slope (ft/ft) | 0.020873 Area (sq ft)       | 429.19          |          |
| Q Total (cfs)      | 2982.00 Flow (cfs)          | 2982.00         |          |
| Top Width (ft)     | 290.67 Top Width (ft)       | 290.67          |          |
| Vel Total (ft/s)   | 6.95 Avg. Vel. (ft/s)       | 6.95            |          |
| Max Chl Dpth (ft)  | 3.27 Hydr. Depth (ft)       | 1.48            |          |
| Conv. Total (cfs)  | 20640.3 Conv. (cfs)         | 20640.3         |          |
| Length Wtd. (ft)   | 46.90 Wetted Per. (ft)      | 291.37          |          |
| Min Ch El (ft)     | 96.01 Shear (lb/sq ft)      | 1.92            |          |
| Alpha              | 1.00 Stream Power (lb/ft s) | 13.34           |          |
| Frctn Loss (ft)    | 0.97 Cum Volume (acre-ft    | ) 2.12          |          |
| C & E Loss (ft)    | 0.01 Cum SA (acres)         | 1.36            |          |
|                    |                             |                 |          |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

### **CROSS SECTION**

RIVER: Creek mod 3

REACH: Creek CI RS: 214.97

INPUT

Description:

Station Elevation Data num= 35

Sta Elev Sta Elev Sta Elev Sta Elev 0 104.25.6600037 104.21 14.69 103.0330.95999 99.4360.58002 97.55 77.53 95.5997.83002 95.76 100.22 95.79 116.5 96.27 185.34 97.98 98 191.65 97.94 201.89 97.79 267.77 96.81 276.68 96.83 279.22 96.81 285.32 95.55 288.3 95.06 296.7 95.25 297.13 95.26 308.42 95.17 310.52 95.16 336.27 94.61 344.14 94.35 347.12 94.35 350.35 95.76 351.77 96.06 360.75 97.95 364.37 98.73 379.74 98.43 405.66 98.01 406.4 98.01 406.6 98 407.12 98.02 452.13 99.21

Manning's n Values num= Sta n Val Sta n Val Sta n Val .04 0 .04 452.13

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 0 452.13 95.05 95.05 95.05 . 1 .3

### CROSS SECTION OUTPUT Profile #100 yr

E.G. Elev (ft) 98.67 Element Left OB Channel Right OB Vel Head (ft) 0.73 Wt. n-Val. 0.040

|                    |                             | CreekMod3.rep.txt |
|--------------------|-----------------------------|-------------------|
| W.S. Elev (ft)     | 97.94 Reach Len. (ft)       | 95.05 95.05 95.05 |
| Crit W.S. (ft)     | 97.94 Flow Area (sq ft)     | 434.67            |
| E.G. Slope (ft/ft) | 0.020697 Area (sq ft)       | 434.67            |
| Q Total (cfs)      | 2982.00 Flow (cfs)          | 2982.00           |
| Top Width (ft)     | 297.99 Top Width (ft)       | 297.99            |
| Vel Total (ft/s)   | 6.86 Avg. Vel. (ft/s)       | 6.86              |
| Max Chl Dpth (ft)  | 3.59 Hydr. Depth (ft)       | 1.46              |
| Conv. Total (cfs)  | 20727.7 Conv. (cfs)         | 20727.7           |
| Length Wtd. (ft)   | 95.05 Wetted Per. (ft)      | 298.86            |
| Min Ch El (ft)     | 94.35 Shear (lb/sq ft)      | 1.88              |
| Alpha              | 1.00 Stream Power (lb/ft s) | 12.89             |
| Frctn Loss (ft)    | 1.96 Cum Volume (acre-ft)   | 1.66              |
| C & E Loss (ft)    | 0.00 Cum SA (acres)         | 1.04              |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

### CROSS SECTION

RIVER: Creek mod 3

REACH: Creek Cl RS: 119.92

INPUT

Description:

Station Elevation Data num= 51 Sta Sta Elev Sta Elev Sta Elev Sta Flev 0 103.6 28.94 101.24 32.06 100.55 61.97 93.82 70.31 93.9 113.54 94.37 149.49 95.33 168.93 95.46 172.48 95.33 179.75 95.06 194.78 94.71 195.44 94.69 239.15 93.87 240.37 93.83 247.6 92.28 249.64 91.47 258.06 91.12 265.63 92.62 275.99 93.02 279.55 93.16 294.29 93.09 327.42 92.26 92.3 329.03 92.05 330.5 92.59 328.3 344.06 97.83 344.5 97.83 349.7 97.64 349.74 97.64 356.54 356.55 97.46 358.32 97.48 360.39 97.51 360.47 97.51 363.4 97.39 363.41 97.39 363.52 97.38 384.62 96.5 385.56 96.46 385.93 96.44 388.36 96.34 388.37 96.34 393.73 96.71 400.98 96.63 401.18 96.65 407.87 97.39 409.41 97.56 409.43 97.56 411.53 97.45 411.57 97.45 411.8 97.44

Manning's n Values num= 3 Sta n Val Sta n Val Sta n Val 0 .04 0 .04 411.8 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 0 411.8 79.97 79.97 .1 .3

### CROSS SECTION OUTPUT Profile #100 yr

| E.G. Elev (ft)     | 96.19 Element               | Left OB Channel | Right OB          |
|--------------------|-----------------------------|-----------------|-------------------|
| Vel Head (ft)      | 0.78 Wt. n-Val.             | 0.040           | 1 <del>3</del> 40 |
| W.S. Elev (ft)     | 95.42 Reach Len. (ft)       | 79.97 79.97     | 79.97             |
| Crit W.S. (ft)     | 95.42 Flow Area (sq ft)     | 422.01          |                   |
| E.G. Slope (ft/ft) | 0.020578 Area (sq ft)       | 422.01          |                   |
| Q Total (cfs)      | 2982.00 Flow (cfs)          | 2982.00         |                   |
| Top Width (ft)     | 275.00 Top Width (ft)       | 275.00          |                   |
| Vel Total (ft/s)   | 7.07 Avg. Vel. (ft/s)       | 7.07            |                   |
| Max Chl Dpth (ft)  | 4.30 Hydr. Depth (ft)       | 1.53            |                   |
| Conv. Total (cfs)  | 20787.7 Conv. (cfs)         | 20787.7         |                   |
| Length Wtd. (ft)   | 79.97 Wetted Per. (ft)      | 276.37          |                   |
| Min Ch El (ft)     | 91.12 Shear (lb/sq ft)      | 1.96            |                   |
| Alpha              | 1.00 Stream Power (lb/ft s) | 13.86           |                   |
| Frctn Loss (ft)    | 1.58 Cum Volume (acre-ft    | 0.72            |                   |
| C & E Loss (ft)    | 0.03 Cum SA (acres)         | 0.42            |                   |
|                    |                             |                 |                   |

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical

### CreekMod3.rep.txt

depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

### CROSS SECTION

RIVER: Creek mod 3

REACH: Creek Cl

RS: 39.95

**INPUT** 

Description:

Station Elevation Data num= 31

 Sta
 Elev
 Sta
 Elev
 Sta
 Elev
 Sta
 Elev
 Sta
 Elev
 Sta
 Elev
 93.16
 93.21
 93.21
 93.22
 93.43
 123.26
 93.45
 151.16
 92.51
 157.17
 92.3

 182.64
 91.34
 207.7
 90.79
 210.52
 89.25
 215.27
 88.31
 224.7
 88.31

 236.94
 88.32
 240.69
 88.32
 253.65
 88.43
 275.45
 89.99
 302.32
 91.25

 324.7
 91.3
 332.95
 91.3
 339.62
 92.41
 340.12
 92.43
 357.12
 93.04

 378.1
 93.43
 394.47
 97
 404.13
 99.23
 406.37
 99.28
 420.1
 98.38

 441.24
 96.46

Manning's n Values num= 3 Sta n Val Sta n Val Sta n Val 0 .04 0 .04 441.24 .04

Bank Sta: Left Right Coeff Contr. Expan. 0 441.24 .1 .3

### CROSS SECTION OUTPUT Profile #100 yr

| E.G. Elev (ft)     | 93.34 Element               | Left OB Channel Right C | В |
|--------------------|-----------------------------|-------------------------|---|
| Vel Head (ft)      | 1.03 Wt. n-Val.             | 0.040                   |   |
| W.S. Elev (ft)     | 92.30 Reach Len. (ft)       |                         |   |
| Crit W.S. (ft)     | 92.30 Flow Area (sq ft)     | 365.56                  |   |
| E.G. Slope (ft/ft) | 0.019101 Area (sq ft)       | 365.56                  |   |
| Q Total (cfs)      | 2982.00 Flow (cfs)          | 2982.00                 |   |
| Top Width (ft)     | 181.86 Top Width (ft)       | 181.86                  |   |
| Vel Total (ft/s)   | 8.16 Avg. Vel. (ft/s)       | 8.16                    |   |
| Max Chl Dpth (ft)  | 3.99 Hydr. Depth (ft)       | 2.01                    |   |
| Conv. Total (cfs)  | 21576.5 Conv. (cfs)         | 21576.5                 |   |
| Length Wtd. (ft)   | Wetted Per. (ft)            | 182.53                  |   |
| Min Ch El (ft)     | 88.31 Shear (lb/sq ft)      | 2.39                    |   |
| Alpha              | 1.00 Stream Power (lb/ft s) | 19.48                   |   |
| Frctn Loss (ft)    | Cum Volume (acre-ft)        |                         |   |
| C & E Loss (ft)    | Cum SA (acres)              |                         |   |
|                    |                             |                         |   |

Warning: Slope too steep for slope area to converge during supercritical flow calculations (normal depth is below critical depth). Water surface set to critical depth.

### SUMMARY OF MANNING'S N VALUES

River: Creek mod 3

| Reach    | River Sta. | n1  | n2  | n3  |
|----------|------------|-----|-----|-----|
| Creek Cl | 353.54     | .04 | .04 | .04 |
| Creek CI | 261.87     | .04 | .04 | .04 |
| Creek Cl | 214.97     | .04 | .04 | .04 |
| Creek CI | 119.92     | .04 | .04 | .04 |
| Creek Cl | 39.95      | .04 | .04 | .04 |

### River: Creek mod 3

| Reach    | River Sta. | Left  | Channel | Right |
|----------|------------|-------|---------|-------|
| Creek Cl | 353.54     | 91.67 | 91.67   | 91.67 |
| Creek Cl | 261.87     | 46.9  | 46.9    | 46.9  |
| Creek Cl | 214.97     | 95.05 | 95.05   | 95.05 |
| Creek Cl | 119.92     | 79.97 | 79.97   | 79.97 |
| Creek Cl | 39.95      |       |         |       |

### SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Creek mod 3

| River Sta. | Contr.                               | Expan.   |
|------------|--------------------------------------|--|
| 353.54     | .1                                   | .3   |
| 261.87     | .1                                   | .3   |
| 214.97     | .1                                   | .3   |
| 119.92     | .1                                   | .3   |
| 39.95      | .1                                   | .3   |
|            | 353.54<br>261.87<br>214.97<br>119.92 | 353.54 .1<br>261.87 .1<br>214.97 .1<br>119.92 .1 |

### Profile Output Table - Standard Table 1

| Reach<br># Chl   | River Sta | Profile | Q Total | Min Ch El | W.S. Elev | Crit W.S.  | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude |
|------------------|-----------|---------|---------|-----------|-----------|------------|-----------|------------|----------|-----------|-----------|--------|
|                  |           | (cfs)   | (ft)    | (ft)      | (ft)      | (ft) (ft/f | t) (ft/s) | (sq ft)    | (ft)     |           |           |        |
| Creek Cl<br>1.01 | 353.54    | 100 yr  | 2982.00 | 99.20     | 102.93    | 102.93     | 103.73    | 0.020370   | 7.17     | 415.83    | 263.59    |        |
| Creek Cl         | 261.87    | 100 yr  | 2982.00 | 96.01     | 99.28     | 99.28      | 100.03    | 0.020873   | 6.95     | 429.19    | 290.67    | 1.01   |
| Creek Cl         | 214.97    | 100 yr  | 2982.00 | 94.35     | 97.94     | 97.94      | 98.67     | 0.020697   | 6.86     | 434.67    | 297.99    | 1.00   |
| Creek Cl         | 119.92    | 100 yr  | 2982.00 | 91.12     | 95.42     | 95.42      | 96.19     | 0.020578   | 7.07     | 422.01    | 275.00    | 1.01   |
| Creek Cl         | 39.95     | 100 yr  | 2982.00 | 88.31     | 92.30     | 92.30      | 93.34     | 0.019101   | 8.16     | 365.56    | 181.86    | 1.01   |

PARCON



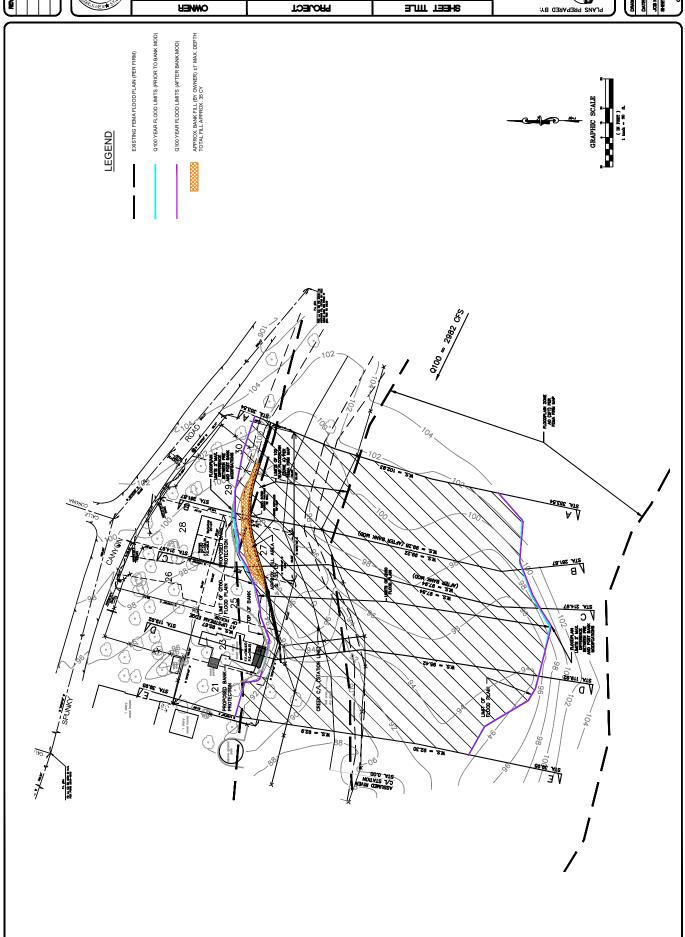
KRIS KIM 9030 TOURNAMENT DR. PALMDALE, CA 93651 PHONE: (661) 510-3535

GEEEN AFITEA' CY 91390 1210S SENNKA CYNAON BD' KKIS KIW HONSE

### DRAINAGE MAP

(eei) 948-0802 179 WEZI PONDEN SINCE 189 WEZI PONDEN SINCE 180 WEZ









GEEEN APITEA' CY 31330 12105 SENNKA CYNAON ED' KKIS KIW HONSE

PROJECT

3JMT T33H8







